

CLAIMS:

1. An image processing system comprising data acquisition means for acquiring image data of an object in an image and processing means for characterizing a boundary of the object comprising computing means for identifying the object boundary and
5 reference points of said object boundary within an observation window; and for decomposing said object boundary into boundary unit elements, centred at the reference points;
this image processing system further comprising processing means for:
coding each reference point using coding data including spatial information and
10 intensity information relating to said reference point and the corresponding unit element;
computing transform coefficients from said coding data;
representing said object boundary by a polynomial transform function using a finite number of said coefficients; and comprising viewing means for:
15 visualizing object images and/or processed images.
2. The system of claim 1, wherein the means for coding the reference points yield spatial the information based on the size of the unit elements; and yield the intensity information based on the number of intensity levels along the boundary.
3. The system of one of Claims 1 or 2, wherein the means for coding the reference
20 points represent each boundary unit element by a dipole of strength proportional to the size of the boundary unit element, centred at the reference points and oriented along the outward normal direction to the object boundary; and
the means for yielding the transform coefficients compute said coefficients from said dipoles for further representing said object boundary by a polynomial transform
25 function using a finite number of said coefficients.
4. The system of one of Claims 1 to 3, wherein the transform coefficients are Hermite transform coefficients.
5. The system of claim 4, wherein the computing means for computing transform coefficients from said dipoles comprise means for integrating the effect of each dipole
30 into the transform coefficients, the contribution of each dipole being computed analytically knowing its position within the window, its strength and its orientation.

6. The system of one of Claims 1 to 5, comprising means for smoothing the boundary of an object by varying the number of used transform coefficients.
7. The system according to one of Claims 1 to 5, comprising means for comparing two corresponding boundaries of two different images of an object, by comparing their transform coefficients.
8. The system of claim 7, comprising means for matching two corresponding boundaries of two different images of an object, by matching their transform coefficients.
9. The system of claim 8, wherein the means for matching the transform coefficients of said boundaries comprises means for applying translation, rotation, scale change to the transform coefficients of one of the corresponding boundary of the object in one image.
10. The system of claim 8, comprising means for performing correlation of the corresponding boundaries of an object in different images by comparing the corresponding transform coefficients of the boundaries in the images and matching said transform coefficients.
11. The system of one of claims 6 to 10, comprising means for acquiring real image data for forming the two images of the object; or virtual image data for forming the two images of the object; or real image data for forming the first image of the object and virtual image data for forming the second image of the object; and comprising means for comparing or matching or correlating corresponding boundaries of the different images of the object, by comparing or matching or performing correlation of corresponding coefficients of the real or virtual boundaries, including when necessary means for applying translation, rotation, scale change to the transform coefficients of at least one of the corresponding boundary of the object in one image.
12. An image processing method to cause the data processing means of the image processing system of one of Claims 1 to 10 to perform steps of acquiring image data of an object in an image and characterizing a boundary of the object, comprising identifying the object boundary and reference points of said object boundary within an observation window; and decomposing said object boundary into boundary unit elements, centred at the reference points; this method further comprising steps of:

coding each reference point using coding data including spatial information and intensity information relating to said reference point and the corresponding unit element;

computing transform coefficients from said coding data;

5 representing said object boundary by a polynomial transform function using a finite number of said coefficients; and

visualizing object images and/or processed images.

13. A medical examination apparatus comprising acquisition means for acquiring medical image data, and an image processing system according to one of Claims 1 to 10
10 for processing the medical image data.

14. A computer program product having a set of instructions, when in use on a general-purpose computer, to cause the computer to perform the steps of the method according to Claim 11.